REMARKS

Claims 10, and 13–30 are pending in this application. By this Amendment, claims 1–9, 11, and 12 are canceled, and claims 13–30 are added. Support for new claims 13–30 can be found, for example, in original claims 1–9, 11, and 12. Claims 14 and 23, which depend from claims 13 and 22 respectively, contain the subject matter of canceled claim 8, which was withdrawn from consideration by the Examiner. No new matter is added.

Rejection Under 35 U.S.C. §102

The Office Action rejects claims 1 and 4–7 under 35 U.S.C. §102(b) as being anticipated by Ward (U.S. Patent No. 4,032,259). By way of this amendment, claims 1 and 4–7 are canceled, rendering the rejection moot.

Rejections Under 35 U.S.C. §103

The Office Action rejects claims 2, 3, and 9 under 35 U.S.C. §103(a) as being unpatentable over Ward. By way of this amendment, claims 2, 3, and 9 are canceled, rendering the rejection moot.

The Office Action rejects claims 11 and 12 under 35 U.S.C. §103(a) as being unpatentable over Ward in view of Wagaman (U.S. Patent No. 6,165,295). By way of this amendment, claims 11 and 12 are canceled, rendering the rejection moot.

New Claims

By this Amendment, claims 13–30 are added. New claim 13 distinguishes over the cited references, Ward and Wagaman, for at least the following reasons.

Claim 13 recites: "A pyrotechnic hydrogen generator for a proton exchange membrane fuel cell, comprising: a solid composition comprising an alkali metal borohydride or alkaline earth metal borohydride and strontium nitrate $Sr(NO_3)_2$, wherein combustion of the solid composition generates hydrogen and is self-sustaining."

Neither of the cited references discloses a pyrotechnic hydrogen generator for a proton exchange membrane fuel cell, and thus cannot be said to anticipate claim 13. Claims 14–30 depend either directly or indirectly from claim 13 and, thus, also are not anticipated by Ward and Wagaman.

Furthermore, Ward and Wagaman would not have rendered obvious the device of claim 13. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Office Action asserts that Ward discloses the solid composition of claim 1. The subject matter of claim 1 has been incorporated into claim 13. The Office Action correctly recognizes that Ward fails to disclose using its solid composition as a pyrotechnic hydrogen generator for a proton exchange membrane fuel cell. The Office Action asserts that Wagaman cures this deficiency, asserting that Wagaman "discloses that a rocket propellant can be used for a fuel cell." The Office Action concludes that it would have been obvious to combine the solid composition of Ward with the disclosure of Wagaman to achieve the device of claim 13. Applicants respectfully disagree with the characterizations of the cited references and the resultant conclusion.

First, the Office Action implicitly asserts that Ward teaches or suggests that its solid composition is a "rocket propellant." Ward discloses "an improved pyrotechnic composition having a metal pyrotechnic fuel and an oxidizer for *producing light, heat, smoke* and

sound..." (emphasis added). *See* Ward at column 2, lines 5–7. Although Ward indicates that its solid composition can be used in rocket motor igniters to provide more reliable ignition, this does not imply that the composition is a rocket propellant. *Hawley's Condensed Chemical Dictionary* defines "pyrotechnics" as "the formulation and manufacture of fireworks, signal flares, and military warning devices." *See* page 946 (attached). *Hawley's* states that the primary ingredients of pyrotechnic products are oxidizers, fuels, and binders. *Id.* Hawley's further states that black powder is used as a propellant. *Id.* Ward discloses that its invention is the use of a metal hydride as a pyrotechnic fuel (see column 2, lines 8–10) that is mixed with a conventional oxidizer, such as strontium nitrate, in a "manner similar to that employed in conventional pyrotechnic devices" (see column 2, lines 58–62). Nowhere does Ward teach or suggest that its pyrotechnic composition is a rocket propellant, or may be used as a rocket propellant. Those of ordinary skill in the art would recognize that the composition of Ward is not a rocket propellant, as evidenced in *Hawley's*.

Second, the Office Action asserts Wagaman "discloses that a rocket propellant can be used for a fuel cell" citing to column 3, lines 44–48. Applicants respectfully disagree with this characterization. What Wagaman discloses is a "family of water-based gas-generating liquid compositions which may be used in rocket propulsion..." (emphasis added). *See* Wagaman at column 3, lines 45–46. Wagaman further indicates that other applications for the liquid compositions "include use in oxygen generators and fuel cells." *Id* at lines 47–48. However, the water-based gas-generating liquid composition is not a rocket propellant in and of itself. Wagaman discloses that its water-based gas-generating liquid composition is used as an oxidizer in rocket propulsion; blending the liquid composition with a fuel produces a rocket propellant. S*ee, e.g.*, column 8. Therefore, Wagaman does not disclose that a rocket propellant can be used for a fuel cell.

As discussed above, the Office Action implicitly asserts that Ward discloses a rocket propellant. The Office Action also asserts that Wagaman teaches that a rocket propellant can be used for a fuel cell. The Office Action concludes that it would have been obvious to take the composition of Ward and use it as a fuel cell as taught by Wagaman to obtain the device of claim 13. However, Ward does not disclose a rocket propellant, but a solid pyrotechnic composition. Wagaman does not teach that a rocket propellant can be used for a fuel cell, but rather a water-based gas-generating liquid composition that may be used in fuel cells. There is no teaching or suggestion that the solid composition of Ward and the liquid composition of Wagaman are in any way interchangeable, similar, or may be used for the same purpose. Absent such teaching or suggestion, there is no motivation to combine the references.

Furthermore, neither reference discusses or suggests a pyrotechnic hydrogen generator for a proton exchange membrane fuel cell.

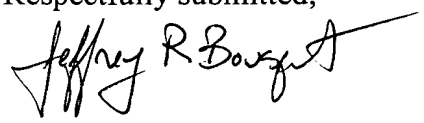
Ward and Wagaman fail to teach or suggest each and every feature of claim 13. Additionally, there lacks any suggestion or motivation to combine the references. Therefore, Ward and Wagaman would not have rendered obvious claim 13. New claim 13 is believed to be patentable over the cited references. New claims 14–30 depend from claim 13 and, thus, are also believed to be patentable over the cited references. Prompt examination and allowance of new claims 13–30 are respectfully requested.

Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 13–30 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:
Hawley's Condensed Chemical Dictionary, 13th ed. New York, International Thomson Publishing, Inc., 1997. p. 946.

Date: August 1, 2006

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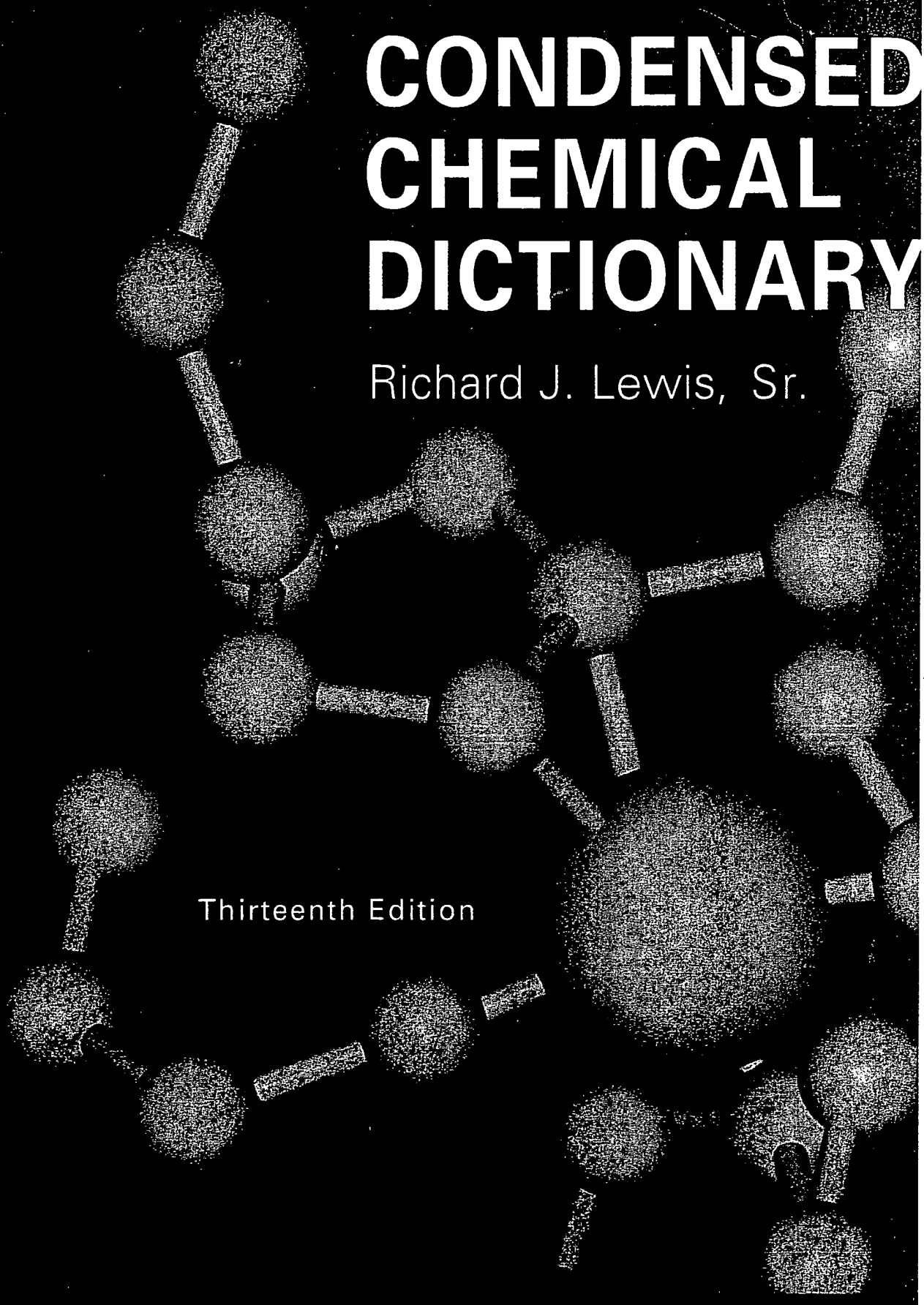

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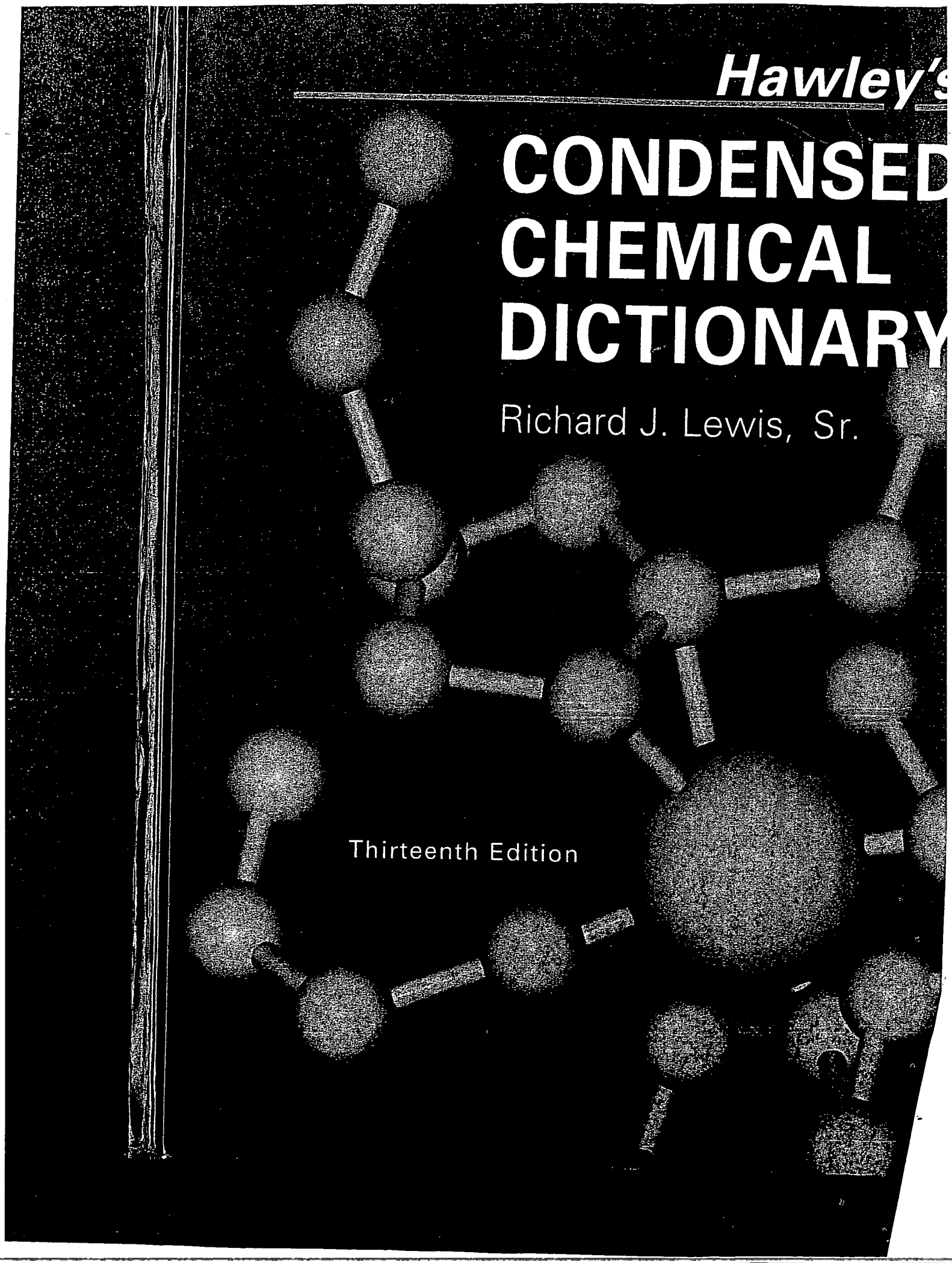
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CIP

Properties: Colorless, mobile, very refractive, fuming liquid. D 1.819, bp 146C, fp −38C, refr index 1.449 (19C).
Hazard: Decomposes violently with water to sulfuric acid and hydrochloric acid. Corrosive to tissue.
Use: Organic synthesis.

pyrotartaric acid. (methylsuccinic acid). $HOOCCH(CH_3)CH_2COOH$.
Properties: White or yellowish crystals. D 1.4105, mp 111–112C. Soluble in water, alcohol, and ether.
Derivation: By distilling tartaric acid.
Use: Organic synthesis.

pyrotartaric acid, normal. See glutaric acid.

pyrotechnics. The formulation and manufacture of fireworks, signal flares, and military warning devices. The industry is professionally represented by the Pyrotechnic Guild International, Inc. The primary ingredients of pyrotechnic products are as follows: (1) Oxidizers: potassium nitrate, potassium chlorate, or potassium perchlorate; ammonium perchlorate; barium chlorate and nitrate; and strontium nitrate. (2) Fuels: aluminum, magnesium, antimony sulfate, dextrin, sulfur, and titanium. (3) Binders: dextrin and various polymers. Colored flames are produced by strontium compounds (red); barium compounds (green); copper carbonate, sulfate, and oxide (blue); sodium oxalate and cryolite (yellow); and magnesium, titanium, or aluminum (white). Black powder is used as propellant.
See chemiluminescence.

pyrovanadic acid. See vanadic acid.

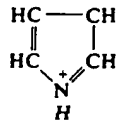
"Pyrovatex" CP *[Ciba-Geigy].* TM for a fiber-reactive phosphone alkyl amide.
Properties: Odorless, nontoxic, nonirritating, stable to laundering and dry-cleaning. Reduces tear and tensile strengths, no effect on "hand." Compatible with other finishing and proofing agents and precured durable-press processes. From 25 to 35% by weight is required; imparts self-extinguishing properties to cotton.
Use: Flame-retardance of 100% cotton fabrics, such as those used for tenting, military uniforms, draperies, etc.

pyroxylin. See nitrocellulose.

pyrrhotite. (magnetic pyrites; pyrrhotine). FeS. A natural iron sulfide. Frequently has a deficiency in iron. May contain small amounts of nickel, cobalt, manganese, and copper.
Properties: Brownish-bronze color, black streak, metallic luster. Slightly magnetic. Hardness 4. D 4.6.
Occurrence: Tennessee, Pennsylvania, Europe, Canada.
Use: Ore of iron, manufacture of sulfuric acid.

pyrrobutamine phosphate. (1-[4(*p*-chlorophenyl)-3-phenyl-2-butenyl]pyrrolidine diphosphate).
$ClC_6H_4CH_2C(C_6H_5):CHCH_2NC_4H_8 \cdot 2H_3PO_4$.
Properties: Cream to off-white powder; slight odor; bitter taste. Melting range 127–131C. Soluble in water; slightly soluble in alcohol; almost insoluble in chloroform and ether.
Grade: NF.
Use: Medicine (antihistamine).

pyrrole.
CAS: 109-97-7. Pyrrole is regarded as a resonance hybrid and no one structure adequately represents it. The following is an approximation:

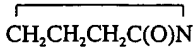


Properties: Yellowish or brown oil; burning, pungent taste; odor similar to chloroform. Readily polymerizes by the action of light and turns brown. Bp 130–131C, fp −24C, d 0.968 (20/4C), refr index 1.5091 (20C), flash p 102F (38.9C) (TCC). Soluble in alcohol, ether, dilute acids, and most organic chemicals; insoluble in water and dilute alkalies. Combustible.
Derivation: Fractional distillation of bone oil with sulfuric acid.
Method of purification: Conversion into the potassium compound (C_4H_4NK), washing with ether, and treatment with water, followed by drying and distillation.
Grade: Technical.
Hazard: Moderate fire risk. Toxic by ingestion and inhalation.
Use: Manufacture of pharmaceuticals.

pyrrolidine.
CAS: 123-75-1. C_4H_9N.
Properties: Colorless to pale-yellow liquid; penetrating aminelike odor. D 0.8660 (20/20C), fp −60C, bp 87C, refr index 1.4425 (20C), flash p 37F (2.7C) (TCC). Soluble in water and alcohol.
Grade: 95% min purity.
Use: Intermediate for pharmaceuticals, fungicides, insecticides, rubber accelerators, citrus decay control, curing agent for epoxy resins, inhibitor.
Hazard: Flammable, dangerous fire risk. Toxic by ingestion and inhalation.

2-pyrrolidinecarboxylic acid. See proline.

2-pyrrolidone. (2-pyrrolidinone; butyrolactam).
CAS: 616-45-5.



$CH_2CH_2CH_2C(O)NH$.